

Inventor: Sally Mackenzie
Title: Implementation of a Mitochondrial Mutator
Docket No.: 1231-218

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	1	50
Arabidopsis	(1) --MHWIATRNAVVSFPKWR---FFFRSSYRTYSSLKPSSPILLNRRYSEG	
Common Bean	(1) --MYRAVTRNAVFLPRCRSLSHFSLSLFPFFISSLPSRFLRINGRVKNV	
Soybean	(1) --MYRVATRNAVAVFFPRCCSFAHYTPSLFPIFTSFAPSRFLRINGCVKNV	
Rice	(1) MAIQRL LASSLVAATPRWLP-----VAADSFLRRRHRPRCSPLPALLFNR	
Tomato	(1) --MYWVTAKNVVVSVPWR-----SLSLFLRPPLRRRFLSFSPTLC	
Consensus	(1) MYRV TRNVVS PRWR F SSF F S PSR L ING V N	
	51	100
Arabidopsis	(46) ISCLR DGSKLKRIT TASKKVKTSSDVLTDKDL SHLVWVKERLQTCKKPST	
Common Bean	(49) STYMDN NRVSRGSSRTTKPKVPNNVLDDKDLPHISWWKERLQMCKKFST	
Soybean	(49) PSYTDKKVS-RGSSRATKKPKIPNNVLDDKDLPHILWWKERLQMCKKFST	
Rice	(46) RSWSKPRKVSRSISIVSRKMKNQGDLCNEGMLPHILWWKEKMERCRKPSS	
Tomato	(41) REQIRC VKERKFFATTAKKLQPKSIPEEKDYVNIMWWKERMEFLRKPSS	
Consensus	(51) SYIR K R S SKKLK P VLDDKDLPHILWWKERLQ CRKPST	
	101	150
Arabidopsis	(96) LQLIERL MYTNLLGLDPSLRNGSLKDG NLNWEMLQFKSRFPREVLLCRVG	
Common Bean	(99) VQLIQRLEFSNLLGLDSKLKNGSVKEGTLNWEMLQFKSKFPQVLLCRVG	
Soybean	(98) VQLIERLEFSNLLGLNSNLKNGSLKEGTLNWEMLQFKSKFPQVLLCRVG	
Rice	(96) MQLTQRLVYSNILLGLDPTLRNGSLKDGSLNTEMLQFKSKFPREVLLCRVG	
Tomato	(91) ALLAKRLTYCNLLGVDPSLRNGSLKEGTLNSEMLQFKSKFPREVLLCRVG	
Consensus	(101) VQLI RL YSNLLGLDPSLRNGSLKEGTLNWEMLQFKSKFPREVLLCRVG	
	151	200
Arabidopsis	(146) EFYEAIGIDACILVEYAGLNPF GGLRSDSIPKAGCPIMNLRQTLDDLTRN	
Common Bean	(149) EFYEA WGIDACVLVEYAGLNPCGGLQSDSVPRAGCPVVNLRQTLDDLTON	
Soybean	(148) EFYEA WGIDACILVEYVGLNPIGGLRSDSIPRASC PVVNLRQTLDDLTTN	
Rice	(146) DFYEA VGFDACILVEHAGLNPF GGLRSDSIPKAGCPVMNLRQTLDDLTRC	
Tomato	(141) DFYEAIGFDACILVEYAGLNPF GGLHSDSIPKAGCPVVNLRQTLDDLTRN	
Consensus	(151) EFYEAIGIDACILVEYAGLNPF GGLRSDSIPKAGCPVVNLRQTLDDLTRN	
	201	250
Arabidopsis	(196) GYSVCIVEEVQGPTPARSRKGRFISGH AHPGSPYVYGLVGDHDLDFPDP	
Common Bean	(199) GYSVCIIEEVQGPTQARSRKRRFISGH AHPGNPYVYGLAAVDHDLNFPEP	
Soybean	(198) GYSVCIVEEAQGPSQARSRKRRFISGH AHPGNPYVYGLATVDHDLNFPEP	
Rice	(196) GYSVCIVEEIQGPTQARARKGRFISGH AHPGSPYVFG LAEVDHDFPDP	
Tomato	(191) GFSVCVVEEVQGPTQARARKSRFISGH AHPGSPYVFG LVXDDQDLDFPDP	
Consensus	(201) GYSVCIVEEVQGPTQARSRK RFISGH AHPGSPYVYGLA VDHDLDFPDP	
	251	300
Arabidopsis	(246) MPVVGISRSARGYCMISIFETMKAYS LDDGLTEEALVTKLRTRCHHLFL	
Common Bean	(249) MPVIGISHSARGYCINMVLETMKTYSYEDCLTEEAI VTKLRTCQYHHLFL	
Soybean	(248) MPVVGISHSARGYCINMVLETMKTYSSEDCLTEEAVVTKLRTCQYHYLFL	
Rice	(246) MPVVGISRSAGGYCLISVLETMKTYSAE EGLTEEAVVTKLRICRYHHLFL	
Tomato	(241) MPVVGISRSAGGYCIISVYETMKTYSVEDGLTEEAVVTKLRTRCHHFFL	
Consensus	(251) MPVVGISRSARGYCIISVLETMKTYS EDGLTEEAVVTKLRTRYHHLFL	
	301	350
Arabidopsis	(296) HASLRHNASGTCRWGEFGE GGLWGECSRNFEWFEGDTLSELLSRVKDV	
Common Bean	(299) HTSLTQDSCGTSKWGEFGE GGLWGECSRHFEWFDGSP LSDLVKVKEL	
Soybean	(298) HTSLRRNSCGTCNWGEFGE GGLWGECSRHFDWFDGNPVSDDLAKVKEL	
Rice	(296) HSSLRNNSSGTSRWGEFGE GGLWGECSGKSF EWF DGNPIEELLCKVREI	
Tomato	(291) HNSLKNNSSGTSRWGEFGE GGLWGE CNARQEWLDGNPIDELLFKVKEL	
Consensus	(301) HTSLRNNSSGTSRWGEFGE GGLWGE CSSR FEWFDGNPISELL VKEL	
	351	400

Figure 3

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Arabidopsis	(346)	YGLDDEVSFERNVNPVSKNRPRPLHLGTATQIGALPTEGIPCLLKVLLPST	
Common Bean	(349)	YGLDDEVTFRNNTTVSSRRHRARPLTLGTSTQIGAIHTEGIPSLLKVLLSPS	
Soybean	(348)	YSIDDEVTFRNNTTVSSGHRARPLTLGTSTQIGAIPTGEGIPSLLKVLLPSN	
Rice	(346)	YGLEEKTVFRNVSVSLEGRPQPLYLGTATQIGVIPTEGIPSLLKIVLPPN	
Tomato	(341)	YGLNDDIPFRNVTVSENRRPRPLHLGTATQIGAIPTGEGIPCLLKVLLPPH	
Consensus	(351)	YGLDDEVTFRNVTVSS RPRPLHLGTATQIGAIPTGEGIPSLLKVLLPP	
		401	450
Arabidopsis	(396)	CSGLPSLYVRDLLLLNPPAYDIALKIQETCKLMSTVTCSIPEFTCVSSAKL	
Common Bean	(399)	CNGLPVLYIRNLLLLNPPSYEIASKIQETCKLMSSLTCSIPEFTCVSSAKL	
Soybean	(398)	CNGLPVLYIRELLLLNPPSYEIASKIQATCKLMSSVTCSIPEFTCVSSAKL	
Rice	(396)	FGGLPSLYIRDLLLLNPPSFDVASSVQEACRLMGSITCSIPEFTCIPAAKL	
Tomato	(391)	CSGLPVLYIRDLLLLNPPAYEISSDIQEACRLMMSVTCSIPDFTCISSAKL	
Consensus	(401)	C GLPVLYIRDLLLLNPPSYEIASKIQETCKLMSSVTCSIPEFTCVSSAKL	
		451	500
Arabidopsis	(446)	VKLEQREANYIEFCRIKNVLDDVLHMRHAELVEILKLLMDPTWVATGL	
Common Bean	(449)	VKLEWREVNHMEFCRIKNVLDEILHMYKTSELNEILKNLIDPTWATTGL	
Soybean	(448)	VKLEWREVNHMEFCRIKNVLDEILQMYSTSELNEILKHLIEPTWVATGL	
Rice	(446)	VKLESKEVNHIEFCRIKNVLDEVLFMGSAELSAELNKLDPAAIVTGF	
Tomato	(441)	VKLELREANHVEFCIKSMVEEILQLYRNSELRAIVELMDPTWVATGL	
Consensus	(451)	VKLE REVNHIEFCRIKNVLDEIL MYR SEL EILK LIDPTWVATGL	
		501	550
Arabidopsis	(496)	KIDFDTFVNECHWASDTIGEMISLDENESHQNVSKCDNVPNEFFYDMESS	
Common Bean	(499)	DIDFETLVSGCEVASSKISEIISLDGGN-DQKINSLSIIPYEFFEDTESK	
Soybean	(498)	EIDFETLVAGCEIASSKIGEIVSLDDEN-DQKINSFSFIPHEFFEDMESK	
Rice	(496)	KVEADILVNECSFISQRIAEVISLGGES-DQAITSSSEYIPKEFFNGMESS	
Tomato	(491)	KVDFDTLVNECGKISCRISEIISVHGEN-DQKISSYPIIPNDFEDMELL	
Consensus	(501)	KIDFDTLVNEC AS KISEIISLDGEN DQKISS IP EFFEDMES	
		551	600
Arabidopsis	(546)	WRGRVKGIHIEEITQVEKSAEALSLAVAEDFHPIISRIKATTASLGGP	
Common Bean	(548)	WKGRIKRVHIDEVFTAVQKAAEVLHIAVTEDFVPVVSRIKATAPLGGP	
Soybean	(547)	WKGRIKRIHIDVFTAVEKAAEALHIAVTEDFVPVVSRIKATAPLGGP	
Rice	(545)	WKGVRKRVHAEFEFSNVDAEALSTAVIEDFLPIISRVKSVMSNGSSK	
Tomato	(540)	WKGVRKRIHLEEAYAEVEKAADALSLAITEFLPIISRIKATMAPLGGTK	
Consensus	(551)	WKGVRKRIHIEE FT VEKAAEALSIAVTEFLPIISRIKATMAPLGGP	
		601	650
Arabidopsis	(596)	GEIAYAREHESVWFKGRFTPSIWAGTAGEDQIKQLKPAIDSKGKKVGEE	
Common Bean	(598)	GEISYAREHEAVWFRGKRFTPSLWSGSPGEEQIKQLRHALDSKGKRVGEE	
Soybean	(597)	GEISYAREQEAVWFKGRFTPNLWAGSPGEEQIKQLRHALDSKGKRVGEE	
Rice	(595)	GEISYAKEHESVWFKGRRFTPNVWANTPGELQIKQLKPAIDSKGKRVGEE	
Tomato	(590)	GEILYAREHGAVWFKGRFVPTVWAGTAGEEQIKQLRPAIDSKGKKVGEE	
Consensus	(601)	GEISYAREHEAVWFKGRFTPSLWAGTPGEEQIKQLRPAIDSKGKKVGEE	
		651	700
Arabidopsis	(646)	WFTTPKVEIALVRYHEASENAKARVLELLRELSVKLQTKINLVFASMLL	
Common Bean	(648)	WFTTPKVEAALTRYHEANAKATERVLEILRELATELHYSINILVFSSTLL	
Soybean	(647)	WFTTPKVEAALTRYHEANAKAKERVLEILRGLAAELQYSINILVFSSTLL	
Rice	(645)	WFTTIKVENALTRYHEACDNAKRKVLLELLRGLSSELQDKINLVFCSTML	
Tomato	(640)	WFTTMRVEDAIARYHEASARAKSRVLELLRGLSSELLSKINILIFASVLN	
Consensus	(651)	WFTTPKVE ALTRYHEA AKAK RVLELLRGLSSELQ KINILVFASMLL	

Figure 3 (cont'd)

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		701	750
Arabidopsis	(696)	VISKALFSHACEGRRRKWVFPTLVGFSLDEGAKPLDGASRMKLTGLSPYW	
Common Bean	(698)	VITKALFAHASEGRRRRWVFPTLAESNGFEDVKSSDKIHGMKIVGLAPYW	
Soybean	(697)	VIAKALFAHASEGRRRRWVFPTLVESHGFEDVKSLDKTHGMKISGLLPYW	
Rice	(695)	IITKALFGHVSEGRRRGWVLPITSP--LCKDNVTEEISSEMELSGTFPYW	
Tomato	(690)	VIAKSLFSHVSEGRRRNWIFPTITQFNKCQDTEALNGTDGMKIIGLSPYW	
Consensus	(701)	VITKALFAHASEGRRRRWVFPTL ED KSLD T GMKISGLSPYW	
		751	800
Arabidopsis	(746)	FDVSSGTAVHNTVDMQSLFLLTGPNNGGKSSLLRSICAAALLGISGLMVP	
Common Bean	(748)	FHIAEG-IVRNDVDMQSLFLLTGPNNGGKSSLLRSICAAALLGICGLMVP	
Soybean	(747)	FHIAEG-VVRNDVDMQSLFLLTGPNNGGKSSFLRSICAAALLGICGLMVP	
Rice	(743)	LDTNQGNAILNDVHMHSLFILTGPNGGGKSSMLRSVCAAALLGICGLMVP	
Tomato	(740)	FDAARGTGVQDVTVDQMFMFLTGPNNGGKSSLLRSICAAALLGMCGFMVP	
Consensus	(751)	FDIA G AV NDVDMQSLFLLTGPNNGGKSSLLRSICAAALLGICGLMVP	
		801	850
Arabidopsis	(796)	AESACIPHFDSIMLHMKSYSYDSPVDGKSSSQVEMSEIRSIVSQATSRSLVL	
Common Bean	(797)	AESAVIPYFDSITLHMKSYSYDSPADKKSSSQVEMSELRSIIGGTTKRSLVL	
Soybean	(796)	AESALIPYFDSITLHMKSYSYDSPADKKSSSQVEMSELRSIIGGTTNRSLVL	
Rice	(793)	AASAVIPHFDSIMLHMKAYSYDSPADGKSSSQIEMSEIRSLVCRATARSVL	
Tomato	(790)	AESAVIPHFDSIMLHMKSYSYDSPVDGKSSSQIEMSEIRSLITGATSRSLVL	
Consensus	(801)	AESAVIPHFDSIMLHMKSYSYDSPADGKSSSQVEMSEIRSII GATSRSLVL	
		851	900
Arabidopsis	(846)	IDEICRGTTETAKGTCTIAGSVVESLDTSGCLGIVSTHLHGIFSLPLTAKNI	
Common Bean	(847)	VDEICRGTTETAKGTCTIAGSIIETLERIGCLGVSTHLHGIFTPLPLNIKST	
Soybean	(846)	VDEICRGTTETAKGTCTIAGSIIETLDGIGCLGIVSTHLHGIFTPLPLNKKNT	
Rice	(843)	IDEICRGTTETAKGTCTIAGSIIERLDNVGCIGIISTHLHGIFDLPLSLHNT	
Tomato	(840)	IDEICRGTTETAKGTCTIAGSVIETLDEIGCLGIVSTHLHGIFDLPLKIKKT	
Consensus	(851)	IDEICRGTTETAKGTCTIAGSIIETLD IGCLGIVSTHLHGIFTPL IKNT	
		901	950
Arabidopsis	(896)	TYKAMGAENVEGQTKPTWKLTDGVCRESLAFETAKREGVPESVIQRAEAL	
Common Bean	(897)	VHKAMGTTCIDGQILPTWKLTDGVCKESLAFETAIREGIPEPIIRRAECL	
Soybean	(896)	VHKAMGTTSIDGQIMPTWKLTDGVCKESLAFETAKREGIPEHIVRRAEYL	
Rice	(893)	DFKAMGTEIIDRCIQPTWKLMDGICRESLAFQTARKEGMPDLIIRRAEEL	
Tomato	(890)	VYKAMGAEYVDGQPIPTWKLIDGICKESLAFETAQREGIPEILIQRAEEL	
Consensus	(901)	VHKAMGTE IDGQIIPTWKLTDGVCKESLAFETAKREGIPE IIRRAE L	
		951	1000
Arabidopsis	(946)	YLSVYAK-----DASAEVVKPDQIITSSNN-----DQQIQKPV	
Common Bean	(947)	YKSVYA-----EENFPNEEKFSTCINNLLNNTTSLY-----SKGFLSGA	
Soybean	(946)	YQLVYAKEMLFENFPNEEKFSTCINVNNLNGTHLH-----SKRFLSGA	
Rice	(943)	YLAMSTN-----SKHTSSAVHHEISIANSTVNSLVEKPNYLRNGLELQS	
Tomato	(940)	YNSAYGNQIPRKIDQIRPLRSDIDLNSTDNSSDQLNGTRQIALDSSTKLM	
Consensus	(951)	Y SVYA EK S INI NL TTSL A	
		1001	1050
Arabidopsis	(979)	SSERSLEKDLAKAIVKICGKKMIEP-----EAIECLSIGARELPPP	
Common Bean	(986)	NQMEGFRQEVERAITVICQDYIMERKNKKIALELPEIKCLLIGKREQPPP	
Soybean	(990)	NQMEVLRREEVERAVTVICQDHIKDLKCKKIALELTEIKCLIIGTRELPPP	
Rice	(987)	GSFGLLRKEIESVVTICKKKLLDLYNKRSISELIEVVVCVAVGAREQPPP	
Tomato	(990)	HRMGISSKKLEDAICLICEKKLIELYKMKNPSEMPMVNCVLIAAREQPAP	
Consensus	(1001)	M ILRKELERAITVIC KKIIE L KK EL EI CLLIGAREQPPP	
		1051	1100

Figure 3 (cont'd)

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Arabidopsis	(1020)	STVGSSCVYVMRRPDKRLYIGQTDDELEGRIRAHRAKEGLQGSSFLYLMVQ
Common Bean	(1036)	SVVGSSSVYVIFTDPKKLYVGETDDLEGRVRRHRLKEGMDEASFLYFLVP
Soybean	(1040)	SVVGSSSVYVMFRPDKKLYVGETDDLEGRVRRHRLKEGMHDASFLYFLVP
Rice	(1037)	STVGRSSIYVIIRRDskLYIGQTDdLVGRLSAHRsKEGMQDATILYILVP
Tomato	(1040)	STIGASSVYIMLRPDKKLYVGQTDDELEGRVRAHRLKEGMENASFLYFLVS
Consensus	(1051)	STVGSSSVYVM RPDKKLYVGQTDDELEGRVRAHRLKEGM DASFLYFLVP
		1101 1150
Arabidopsis	(1070)	GKSMACQLETLLINQLHEQGYSLANLADGKHRNFGTSSSLSTSDVVSIL-
Common Bean	(1086)	GKSLACQFESLLINQLSSQGFQLSNMADGKHRNFGTSNLYA-----
Soybean	(1090)	GKSLACQFESLLINQLSGQGFQLSNIADGKHRNFGTSNLYT-----
Rice	(1087)	GKSIACQLETLLINQLPLKGFKLINKADGKHRNFGISLVPGEAIAA----
Tomato	(1090)	GKSIACQLETLLINQLPNHGFQLTNVADGKHRNFG-----
Consensus	(1101)	GKSIACQLETLLINQL QGFQLSNIADGKHRNFGTS L

Arabidopsis	SEQ ID NO: 3
Common Bean	SEQ ID NO: 47
Soybean	SEQ ID NO: 31
Rice	SEQ ID NO: 22
Tomato	SEQ ID NO: 40
Consensus	SEQ ID NO: 65

Figure 3 (cont'd)